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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

ROUTEMAN, RETAIL DAIRY PRODUCTS (dairy prod.) 1-80.06

B-466 or S-195

U. S. Employment Service in
Cooperation with
California State Employment Service

September 1962

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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

ROUTEMAN, RETAIL DAIRY PRODUCTS 1-80.06

B-466 or S-195

Summary

The General Aptitude Test Battery, B-1002A, was administered to a sample of 61 males employed as Routeman, Retail Dairy Products 1-80.06 by the Carnation Company, Los Angeles, California, for the purpose of developing occupational norms for this occupation. The criterion consisted of supervisory ratings based on a descriptive rating scale. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes G-Intelligence, N-Numerical Aptitude, and Q-Clerical Perception, were selected for inclusion in the test norms.

GATB Norms for Routeman, Retail Dairy Products 1-80.06 B-466 or S-195

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Routeman, Retail Dairy Products 1-80.06.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-466 or S-195

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	90	G	Part 3 Part 4 Part 6	85
N	CB-1-D CB-1-I	110	N	Part 2 Part 6	105
Q	CB-1-B	75	Q	Part 1	80

Effectiveness of Norms

The data in Table V indicate that 11 of the 21 poor workers, or 52 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 52 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 30 of the 40 workers who made qualifying test scores, or 75 percent, were good workers.

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Routeman, Retail Dairy Products 1-80.06.

II. Sample

The General Aptitude Test Battery, B-1002A, was administered during the period February 16 to February 29, 1960, to a sample of 72 male Routemen, Retail Dairy Products employed by the Carnation Company, Los Angeles, California. Eleven workers were excluded from the sample: one because his job duties are specialized in sales promotion and are not comparable to the other Routemen, one because was unable to perform on apparatus tests due to a physical disability, two because of language barriers, two because of inability to understand and follow instructions, three because they had not completed the training period, and two because ratings would not have been valid, since they were discharged for dishonesty between the date of testing and the date of rating. The final sample, therefore, consisted of 61 male Routemen.

Job applicants are required to complete a work application and are given an oral interview. They are required to speak, read and write English but there is no formal education requirement. They must be at least 21 years of age and possess a "Class C" California Operator's license (for operation of commercial vehicle). Job applicants are required to qualify on the "Safe Driver Selection System" test published by Management and Marketing Research Corp. A standard two-day course of classroom training is given to familiarize each new routeman with the company products, rules and route procedures, records and reports required, and to teach selling techniques and methods of combating competitive problems. On-the-job training is given by the supervisor for the first two weeks, or until the new employee is capable of taking over the route alone. New employees are considered trainees for the first six months. All workers in the study are considered experienced workers.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience.

N = 61

	M	σ	Range	r
Age (years)	39.0	9.1	24-58	-.190
Education (years)	11.6	1.8	6-15	.150
Experience (months)	84.5	82.6	7-396	.026

** Significant at the .01 level
* Significant at the .05 level

There is no significant correlation between age, education, or experience, and the criterion. The data in Table II indicate that this sample is suitable for test development purposes with respect to age, education and experience.

III. Job Description

Job Title: Routeman, Retail Dairy Products (dairy prod.) 1-80.06

Job Summary:

Drives a half-ton truck over an established route to deliver dairy products to customers in private households. Prepares requisitions for sufficient quantity of products to fill customers' house. Delivers products ordered and attempts to promote sale of additional items. Prepares and presents statements when due. Collects payment periodically from each customer. Keeps record of charges, discounts, and payments received, and records order information on customer sheets. Solicits new accounts by making personal calls. Submits daily report of sales and money collected to cashier.

Work Performed

Enters check-in room, withdraws from book rack assigned route book, messages, and checks mailed in by customers. Reviews Customer Sheets in route book to refresh memory on notations entered on sheets during previous delivery. Posts on sheets any changes in quantity and type of merchandise ordered by customer through phone calls and prepares requisitions for additional or special merchandise. Records credits on customer sheets for checks received, places checks in safe place on person to be turned in at end of route, and ascertains that statements, prepared for charges due, are folded and inserted in route book in front of customer's account sheet.

Walks out to assigned truck, unlocks electric cable with ignition key, removes cable and plug from refrigeration system receptacle, and places cable and plug into assigned compartment in rear of truck. Inserts route book, opened to first customer sheet, in clip board holder on dashboard, and walks to rear of truck. Opens rear doors, steps up into truck, and checks Hold Overs against hold over form prepared at close of preceding delivery. Stacks and slides cases of hold overs towards front of truck to be accessible to door in cab so that hold overs will be utilized first. Drives truck alongside loading platform and picks up, one at a time, from platform, cases of bottled milk, cream, juices, eggs, butter, etc. and slides cases into truck, checking number of cases received against copy of order form prepared day before. Hands copy of supplemental order form to dockman when additional milk or juices are required for route, and loads in truck. Arranges merchandise in truck to balance weight of load and to place products in position for easy access during route. Checks quantity of merchandise received while loading and makes final check of merchandise against order forms. Rearranges load, where necessary, to facilitate delivery of products on route.

Drives truck following prescribed travel directions on customer sheet to first stop on route. Looks at customer sheet to ascertain quantity and type of products ordered, to review composition of previous orders, to note past buying habits, and to check customer's delivery instructions.

Picks up and places in metal carrier, bottles of milk, cream, eggs, etc. specified on customer sheet. Checks products selected and placed in carrier against customer sheet and selects additional items to promote possible sale based on past deliveries, seasonal sales leaders, and knowledge of family composition and buying habits. Removes and unfolds statement, if payment is due, from customer sheet and places statement in convenient place on person. Walks to customer's house with carrier in either hand and looks for note, or order card left by customer to revise regular order. Removes products ordered from carrier and places items on porch, in built-in dairy box, or in refrigerator inside house according to customer's instructions. Posts quantity and type of products delivered on score card when score card system is utilized. Returns to truck, obtains items ordered by note or order card and not anticipated when making up carrier load, and returns to house to add items to delivery. Announces himself by ringing door bell before making delivery inside house and greets member of family or domestic servant if present. Promotes sale of additional items which customer sees in carrier or had not thought of ordering. Discusses with customer any information which would alter future delivery orders. Presents statement, if due, accepts payment in cash or check, makes change, and gives receipt to customer. Leaves statement, if due, with delivery when customer is not present, picks up and places empty bottles in carrier and walks to truck. Returns products not delivered or sold to proper compartments, places empty bottles in cases segregated according to size of bottle and type of product, with broken and soiled bottles upside down in separate cases. Posts charges and company-authorized discount, if applicable, on customer sheet for products delivered; computes payments, when made, with balance due and enters new balance in proper place; and makes notations concerning changes in delivery dates, orders, delivery instructions, or travel directions when applicable. Turns customer sheet in route book to place second customer sheet on top. Continues to make deliveries until route is completed. Stops truck, as necessary, during route and rearranges products on truck for easy access during deliveries.

Solicits new customers while working route through personal contacts. Receives and follows up on leads furnished by route supervisor and route foreman. Makes personal memoranda of any information gained through conversation with customers concerning births, relatives coming for a visit, party plans, weddings, and club events; and makes suggestions to increase orders or make cash sales. Leaves advertising materials with deliveries on days designated by company to implement newspaper or radio releases.

When route has been completed, prepares load for check-in. Counts and totals each type of product not delivered or sold and clears space in truck for empty bottles. Counts and totals each size of undamaged and damaged empty bottles, and moves bottles to rear of truck, placing damaged bottles to one side. Enters totals of products and empty bottles in specific columns on three copies of hold over and return form.

Returns to plant and drops route book and two copies of hold over and return form into chute going into plant office. Drives to unloading platform, checks bottle turn in with dockman, and leaves one copy of hold over and return form with dockman. Parks truck in assigned stall, removes electric cable from compartment in rear of truck, connects cable to refrigeration system and locks cable in place with ignition key. Listens for refrigeration unit to start and checks to insure that rear and compartment doors are closed.

Enters check-in room, reports to dispatcher-order desk to obtain any messages or information concerning route, and to pick up order forms. Picks up next day's route book from book rack and prepares and turns in to order desk requisitions for merchandise required for next day's route, basing amount and type of products upon knowledge of route, review of customer sheets in route book, and information received from dispatcher. Picks up driver's daily report form and empty cash tray from cashiers counter. Counts and totals cash and checks collected on route and ascertains that amount to be turned in balances with charge collections and cash sales. Prepares driver's daily report, enters amount of cash, and lists checks, credits, and charges. Places coins in tray, takes reports to dispatcher-order desk for recheck of report, and walks to cashier counter.

Turns in cash tray, checks, receipt stubs, and driver's report to cashier: waits for report to be checked by cashier, and signs report. Checks through route book and makes out statements where payment is due. Folds and inserts statements in route book at customer sheets to be presented on next day's route, and returns route book to rack.

IV. Experimental Battery

All of the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of supervisory ratings made on an adaptation of the Descriptive Rating Scale developed by the Bureau of Employment Security, Form SP-21. Two ratings were obtained from the immediate supervisor of each worker, with an eighteen-day interval between the first and second rating. The rating scale consisted of nine items with five alternatives for each item. The alternatives indicated the degree of job proficiency attained, and weights of one through five were assigned to each alternative so that the minimum possible score was nine and the maximum forty-five. The coefficient of reliability between the two ratings was .875, indicating a high significant relationship. The final criterion score consisted of the combined score of the two ratings. The distribution of the combined scores ranged from 30 to 89, with a mean score of 66.246 and a standard deviation of 13.186.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Intelligence (G) - required to discuss customer's needs and to promote sales, to read and interpret information on individual customer sheets, and to apply company policies regarding delivery procedure and credit extensions in a manner to preserve good customer relations.

Numerical Aptitude (N) - required to check quantity of merchandise received from dockmen, to compute charges and discounts on sales, to compute statements of amount due, to balance cash collections against credits posted, and to balance record of hold-overs and estimate amount of merchandise needed for future deliveries.

Clerical Perception (Q) - required to post information to customer record sheets concerning future delivery instructions, merchandise ordered, merchandise delivered, charges and discounts; required to prepare requisition and check merchandise received from dockmen against requisition; required to prepare reports of hold-overs and returns and reports of daily sales and collections.

Manual Dexterity (M) - required to pick up and place products in carrier, to pick up items from carrier and place them in customer's receptacle or on porch, and to arrange containers of products in delivery truck.

On the basis of the job analysis data, none of the aptitudes were considered obviously unimportant for performing the duties of this job and are considered as "irrelevant" aptitudes.

B. Quantitative Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

N = 61

Aptitudes	M	σ	r
G-Intelligence	104.0	12.9	.083
V-Verbal Aptitude	103.0	15.5	.065
N-Numerical Aptitude	107.2	14.7	.193
S-Spatial Aptitude	97.6	16.3	.000
P-Form Perception	94.1	14.3	.233
Q-Clerical Perception	103.7	13.0	.129
K-Motor Coordination	101.2	15.0	.340**
F-Finger Dexterity	91.7	18.2	.215
M-Manual Dexterity	102.7	17.3	.125

**Significant at the .01 level
*Significant at the .05 level

Aptitudes G, V, N and Q have the highest mean scores and aptitudes G, N, P, and Q have relatively low standard deviations. For a sample of 61 cases, correlations of .328 and .252 are significant at the .01 level and the .05 level of confidence, respectively. Aptitude K correlates significantly with the criterion at the .01 level.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data Important	X		X			X			X
Irrelevant									
Relatively High Mean	X	X	X			X			
Relatively Low Sigma	X		X		X	X			
Significant Correlation with Criterion							X		
Aptitudes to be considered for trial norms	G	V	N			Q	K		

Trial norms consisting of various combinations of Aptitudes G, N, Q, and K with appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that B-1002 norms consisting of G-85, N-105, and Q-80 had the best selective efficiency.

VII.. Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing as close as possible to one-third of the sample in the low criterion group. A criterion critical score of 61 was used and resulted in 21 of the workers or 34 percent of the sample being placed in the low criterion group.

Table V shows the relationship between test norms consisting of Aptitudes G, N, and Q with critical scores of 85, 105 and 80 respectively, and the dichotomized criterion for Routeman, Retail Dairy Products 1-80.06. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms for Routeman, Retail Dairy Products 1-80.06

(G-85, N-105, Q-80)

N = 61

	Non Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	10	30	40
Poor Workers	11	10	21
Total	21	40	61

$r_{tet} = .44$ $\quad \chi^2 = 3.441$

$^{o}r_{tet} = .21$ $\quad P/2 = < .05$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes G, N and Q with minimum scores of 85, 105 and 80 respectively, have been established as B-1002 norms for the occupation of Routeman, Retail Dairy Products 1-80.06. The equivalent B-1001 Norms consist of G-90, N-110, and Q-75.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for allocation to any of the existing 35 occupational aptitude patterns. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.